

Development of an Information Model for Solid Organ Transplantation

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Abstract

Information required to manage transplant patients and donors is complex, voluminous and requires the reporting and use of one person's medical information within another person's record. One strategy using a vocabulary model (i.e., LOINC codes with *^DONOR specified in the system axes) will lead to problems with combinatorial explosion. After evaluating workflow processes, data collection forms, decision support and functional requirements, we designed and implemented an extendable information model to support the process of care following liver transplantation.

Background

During 2002, over 24,000 persons in the United States underwent organ transplant surgery.¹ Nationwide and at LDS Hospital, the number of transplantations increases each year, particularly among persons receiving an organ from a living donor.¹ Transplant patients generate large quantities of data that must be interpreted by the clinical team. Currently, the Transplant Program at LDS Hospital uses a paper-based medical record for life-long monitoring of liver transplant patients. The paper record is not always accessible nor can it be used for automated decision support. As the population of patients increases, there is a need to store information in an electronic clinical information system so the data can be used to improve decision-making and the process and outcome of care.

The information required to manage organ recipients and donors is unique. It requires the reporting and use of the donor's medical information within the recipient's record. One strategy uses pre-coordinated LOINC codes with *^DONOR specified in the system axes.² This solution will lead to problems with combinatorial explosion because new LOINC codes will need to be created for already-coded laboratory tests that apply to an organ donor.

Functional requirements for transplant system

- Code data that is required for decision support.
- Make the model generalizable for other organ transplants including kidney and heart.
- Link the recipient to the donor and vice versa.

- Allow recipients and living donors to store follow-up data in their own record.
- Support clinical care and national reporting and research needs.
- Consider privacy issues related to donor data.
- Reflect current processes and relationships between the recipient, donor, and organs.

System Description

After evaluating workflow processes, data collection forms, decision support and functional requirements, an extendable information model has been designed to support the process of care following liver transplantation. Figure 1 illustrates the relationship between entities. The associated attributes will be used for decision support. For example, the patient's status with the program, combined with laboratory results and the date of transplant, will be used to identify the occurrence of over-due lab tests or drug levels out of range. Rather than using pre-coordinated LOINC codes, we will post-coordinate the LOINC codes and specify the subject (donor) of the data in a separate field in the database.

Implications

A new strategy for modeling transplant information will be tested. The advantages and limitations will be described.

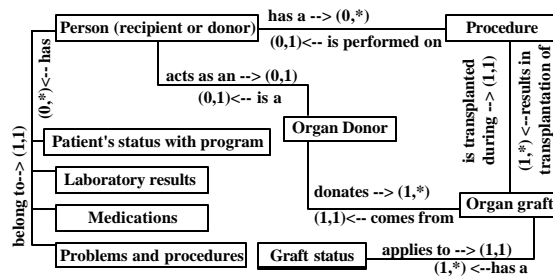


Figure 1. Information model for organ transplant

References

1. United Network for Organ Sharing. Available at <http://www.OPTN.org>.
2. Logical Observation Identifiers Names and Codes, LOINC 2.08, released September 13, 2002 and RELMA 3.7, released September 13, 2002. Available at <http://www.loinc.org>.